

## RAMSES



### Spectral imaging radiometer to measure radiance or irradiance in UV, VIS and UV/VIS

RAMSES radiometers are spectral imaging radiometers to measure radiance, irradiance, or scalar irradiance in the UV, VIS and UV/VIS ranges. Thanks to their ultra small size and weight as well as very low power consumption, they are especially suitable for hand-held and autonomous applications. RAMSES radiometers combine precision hyperspectral light measurements with a maximum of flexibility. The modular system increases cost-effectiveness, while the many accessories and special solutions enable a wide range of applications such as installation on ships, handheld usage or autonomous measurements in remote places, like the Arctic or Antarctica.

#### Benefits

- Extremely low power consumption
- Environmentally robust
- World market leader

#### Applications

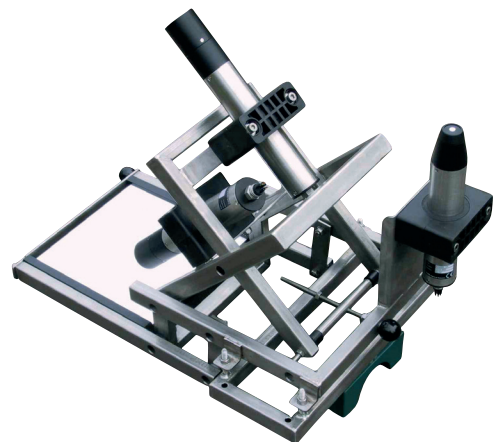
- Water quality
- Field measurements
- Satellite validation
- Biology
- Photosynthesis
- Color measurements
- Climate research



Frame 1



Frame 2



Frame 3

## Technical Specifications

|                                         |                 |                                                           |
|-----------------------------------------|-----------------|-----------------------------------------------------------|
| <b>Measurement technology</b>           | detector        | High-end miniature spectrometer                           |
| <b>Measurement principle</b>            |                 | 256 Channels                                              |
|                                         |                 | Radiance or irradiance                                    |
| <b>Parameter</b>                        |                 | See parameter list p. 3                                   |
| <b>Measuring range</b>                  |                 | See parameter list p. 3                                   |
| <b>Measurement accuracy</b>             |                 | See parameter list p. 3                                   |
| <b>Data logger</b>                      |                 | -                                                         |
| <b>T100 response time</b>               |                 | min. 16 s (burst mode)                                    |
| <b>Measurement interval</b>             |                 | min. 8 s (burst mode)                                     |
| <b>Housing material</b>                 |                 | Stainless steel (1.4571/1.4404) or titanium (3.7035), POM |
| <b>Dimensions (L x Ø)</b>               |                 | ACC 260 mm x 48 mm      ACC ~ 10.2" x 1.9"                |
|                                         |                 | ASC 245 mm x 48 mm      ASC ~ 9.6" x 1.9"                 |
|                                         |                 | ARC 300 mm x 48 mm      ARC ~ 11.8" x 1.9"                |
| <b>Weight</b>                           | stainless steel | 0.9 kg      ~ 2 lbs                                       |
|                                         | titanium        | 0.7 kg      ~ 1.5 lbs                                     |
| <b>Interface</b>                        | digital         | RS-232 (TriOS)                                            |
| <b>Power consumption</b>                |                 | ≤ 0.85 W                                                  |
| <b>Power supply</b>                     |                 | 8...12 VDC (± 3 %)                                        |
| <b>Maintenance effort</b>               |                 | ≤ 0.5 h/month (typical)                                   |
| <b>Calibration/maintenance interval</b> |                 | 24 months                                                 |
| <b>System compatibility</b>             |                 | RS-232 (TriOS protocol)                                   |
| <b>Warranty</b>                         |                 | 1 year (EU: 2 years)      US: 2 years                     |
| <b>INSTALLATION</b>                     |                 |                                                           |
| <b>Max. pressure</b>                    | with SubConn    | 30 bar      ~ 435 psig                                    |
| <b>Protection type</b>                  |                 | IP68      NEMA 6P                                         |
| <b>Sample temperature</b>               |                 | +2...+40 °C      ~ +36 °F to +104 °F                      |
| <b>Ambient temperature</b>              |                 | +2...+40 °C      ~ +36 °F to +104 °F                      |
| <b>Storage temperature</b>              |                 | -20...+80 °C      ~ -4 °F to +176 °F                      |
| <b>Inflow velocity</b>                  |                 | 0.1...10 m/s      ~ 0.33 fps to 33 fps                    |

## RAMSES PARAMETER LIST

|                              | ACC                                                                                  |           |           | ARC                                                                                   | ASC                                                                                   |
|------------------------------|--------------------------------------------------------------------------------------|-----------|-----------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                              |  |           |           |  |  |
|                              | UV                                                                                   | UV/VIS    | VIS       | VIS                                                                                   | VIS                                                                                   |
| Wavelength range* [nm]       | 280...500                                                                            | 280...720 | 320...950 | 320...950                                                                             | 320...950                                                                             |
| Detector*                    | 256 channel silicon photo diode array                                                |           |           |                                                                                       |                                                                                       |
| Pixel dispersion* [nm/pixel] | 2.2                                                                                  | 2.2       | 3.3       | 3.3                                                                                   | 3.3                                                                                   |
| Wavelength accuracy*         | 0.2                                                                                  | 0.2       | 0.3       | 0.3                                                                                   | 0.3                                                                                   |
| Usable channels              | 100                                                                                  | 200       | 190       | 190                                                                                   | 190                                                                                   |

|                                    | ACC-UV                                               | ACC-VIS                                             | ARC-VIS                                                           | ASC-VIS                                             |
|------------------------------------|------------------------------------------------------|-----------------------------------------------------|-------------------------------------------------------------------|-----------------------------------------------------|
|                                    | UV A / UV B irradiance                               | VIS irradiance                                      | VIS radiance                                                      | VIS scalar irradiance                               |
| Wavelength range*                  | 280...500 nm                                         |                                                     | 320...950 nm                                                      |                                                     |
| Typical saturation<br>(IT: 4 ms)** | 20 W m <sup>-2</sup> nm <sup>-1</sup> (at 300 nm)    | 10 W m <sup>-2</sup> nm <sup>-1</sup> (at 400 nm)   |                                                                   | 20 W m <sup>-2</sup> nm <sup>-1</sup> (at 400 nm)   |
|                                    | 17 W m <sup>-2</sup> nm <sup>-1</sup> (at 360 nm)    | 8 W m <sup>-2</sup> nm <sup>-1</sup> (at 500 nm)    | 1 W m <sup>-2</sup> nm <sup>-1</sup> sr <sup>-1</sup> (at 500 nm) | 12 W m <sup>-2</sup> nm <sup>-1</sup> (at 500 nm)   |
|                                    | 18 W m <sup>-2</sup> nm <sup>-1</sup> (at 500 nm)    | 14 W m <sup>-2</sup> nm <sup>-1</sup> (at 700 nm)   |                                                                   | 15 W m <sup>-2</sup> nm <sup>-1</sup> (at 700 nm)   |
|                                    | 0.85 μW m <sup>-2</sup> nm <sup>-1</sup> (at 300 nm) | 0.4 μW m <sup>-2</sup> nm <sup>-1</sup> (at 400 nm) |                                                                   | 0.8 μW m <sup>-2</sup> nm <sup>-1</sup> (at 400 nm) |
| Typical NEI (IT: 8 s)**            | 0.75 μW m <sup>-2</sup> nm <sup>-1</sup> (at 360 nm) | 0.4 μW m <sup>-2</sup> nm <sup>-1</sup> (at 500 nm) | 0.25 μW m <sup>-2</sup> nm <sup>-1</sup> sr <sup>-1</sup>         | 0.6 μW m <sup>-2</sup> nm <sup>-1</sup> (at 500 nm) |
|                                    | 0.80 μW m <sup>-2</sup> nm <sup>-1</sup> (at 500 nm) | 0.6 μW m <sup>-2</sup> nm <sup>-1</sup> (at 700 nm) |                                                                   | 0.8 μW m <sup>-2</sup> nm <sup>-1</sup> (at 700 nm) |
| Collector type                     | cosine response                                      |                                                     | FOV: 7° in air                                                    | Spherical, 2 Pi                                     |
| Accuracy                           | Better than 6-10 % ***                               |                                                     | Better than 6 % ***                                               | Better than 5 % ***                                 |
| Integration time                   | 4 ms...8 s                                           |                                                     |                                                                   |                                                     |

\*) Specifications of Carl ZEISS AG, Germany

\*\*) IT: integration time

\*\*\*) Depends on wavelength range